

Battery Type:		Lithium Ion Polymer Rechargeable			
Part Number:		BP-LP-3-CT111			
Battery Specification:		3.7V / 170mAh			
Ver:		1/TTL			
Issue Date:		03/05/07(a)			
Prepared By	Date	Checked By	Date	Approved By	Date
Customer confirmation:					Date
Note: 1. Please sign above and return on approval. Kindly contact us as soon as possible if the sample is not approved.					

History of revisions		
Prepared by	Approved by	Date

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1. SCOPE:

This specification is applied to BP-LP-3-CT111.

2. PRODUCT SPECIFICATIONS:

No.	ITEM	RATED PERFORMANCE		REMARK
1	Rated Capacity	Typical	170mAh	0.2C@ Discharge
		Minimum	160mAh	
2	Nominal Voltage	3.7V		
3	Voltage at end of Discharge	2.75V		
4	Charging Voltage	4.2 ± 0.03V		
5	Maximum Continuous Charge Current	1CmA		
6	Maximum Continuous Discharge Current	1CmA		
7	Operation Temperature Range	Charge: 0~45°		60 ± 25%R.H.
		Discharge: -20~60°		
8	Storable Temperature Range	1YEAR -20~25°		60 ± 25%R.H.
		3MONTH -20~40°		
		1WEEK -20~60°		
9	Weight	4.6 ± 0.2g		
10	Cell Dimension	Length: Max.30 ± 1.0mm		Shipping Cell
		Width: Max.20 ± 0.5mm		
		Thickness: Max 4.0 ± 0.2mm		

3. PERFORMANCE AND TEST CONDITIONS:

No	ITEM	CRITERIA	TESTING CONDITIONS		
1	Outside Appearance	No abnormal strain, Deformation nor damage	Visual check		
2	External Dimension	According to the attached drawing	Use a calliper (0.05mm a division)		
3	Discharge Time	More than the time Mentioned hereunder	Measure capacity by holding at various temperature for 16Hrs after standard charging		
	Discharge Temperature	-10°	0°	23°	60°
	Discharge Current(0.5C ₅ A)	70%	80%	100%	95%
4	Charge Time	More than the rates Mentioned hereunder	Measure time elapsed till end charge current at the charge conditions mentioned hereunder after standard discharging		
	Charge Current	0.5C ₅ A Less than 4.0hrs	1.0C ₅ A Less than 2.0hrs		
5	Initial Internal Impedance	Less than 250m Ω	Measure by alternate current(1kHz) within 1Hr after charge.(20±5°)		
6	Cycle Life (0.5C ₅ A)	Higher than 70% of the Initial Capacities of the Cells	Carry out 500cycle charging/ Discharging in the below condition. >Charge:CC/CV,0.5C ₅ mA,4.2V, 1/100CmA-End >Discharge:0.5C ₅ mA up to 2.75V >Rest Time between charge/discharge:30min. >Temperature:20±5°		
7	Leakage-Proof	No leakage (visual inspection)	After full charge, store at 60±3° 60±10%RH for 1month.		

(Notice)Tests shall be performed on a new cell within one week after delivery.

4. SAFETY TEST:

ITEM	BATTERY CONDITION	TEST METHOD	RESULTS
Crush	Fresh, Full charged	Crush between two flat plates. Applied force is about 13kN(1.72Mpa) for 30min.	NO EXPLOSION, Or NO FIRE
Short Circuit 20°	Fresh, Full charged	Each test sample battery, in turn, is to be short-circuited by connecting the (+) and (-) terminals of the battery with a Cu wire having a maximum resistance load of 0.1 Ω .Tests are to be conducted at room temperature(20 ± 2°).	NO EXPLOSION, Or NO FIRE The Temperature of the surface of the Cells are lower than 150°
Short Circuit 60°	Fresh, Full charged	Each test sample battery, in turn, is to be short-circuited by connecting the (+) and (-) terminals of the battery with a Cu wire having a maximum resistance load of 0.1 Ω .Tests are to be conducted at temperature(60 ± 2°).	NO EXPLOSION, Or NO FIRE The Temperature of the surface of the Cells are lower than 150°
Impact	Fresh, Full charged	A 56mm diameter bar is inlayed into the bottom of a 10kg weight. And the weight is to be dropped from a height of 1m onto a sample battery and then the bar will be across the centre of the sample.	NO EXPLOSION, Or NO FIRE
Forced Discharge	Fresh, Full charged	Discharge at a current of 1CmA for 2.5h.	NO EXPLOSION, Or NO FIRE
Nail Pricking (3mm)	Fresh, Full charged	Prick through the sample battery with a nail having a diameter of 3mm and remain 2h.	NO EXPLOSION, Or NO FIRE

5. Handling of Cells:

- 5.1 Consideration of strength of film package
 - 1) Aluminium laminated film
Easily damaged by sharp edge parts such as pins and needles, comparing with metal-can-cased LIB.
 - 2). Sealed edge May be damaged by heat above 100°C.
- 5.2 Short circuit prohibited.
Never make short circuit cell. It generates very high current which causes heating of the cells and may cause electrolyte leakage, gassing or very dangerous explosion. The LIP tabs may be easily short-circuited by putting them on conductive surface. (Such outer short circuit may lead to heat generation and damage of the cell.)
An appropriate circuitry with PCM shall be employed to protect accidental short circuit of the battery pack.
- 5.3. Mechanical shock
LIP cells have less mechanical endurance than metal-can-cased LIB.

Falling, hitting, bending, etc. may cause degradation of LIP characteristics.

5.4 Handling of tabs

The LIP tabs are not exceedingly sturdy, especially the aluminium tabs for the terminal. Do not put much force on LIP tabs. (Aluminium tab may easily be torn off by shear force.)
Do not bend tabs unnecessarily.

6. Notices for Designing Battery Packs:

6.1 Pack toughness

Battery pack should have sufficient strength and the LIP cell inside should be protected from mechanical shocks.

6.2 Cell fixing

The LIP cell should be fixed to the battery pack by its large surface area.
No cell movement in the battery pack should be allowed.

6.3 Inside design

No sharp edge components should be inside the pack containing the LIP cell.

6.4 Tab connection

Ultrasonic welding is recommended for LIP tab connection method.
Battery pack should be designed that shear force are not applied to the LIP tabs.

6.5 For mishaps

Battery pack should be designed not to generate heat even when leakage occurs due to mishaps.

- 1) Isolate PCM (Protection Circuit Module) from leaked electrolyte as perfectly as possible.
- 2) Avoid narrow spacing between bare circuit patterns with different voltage. (Including around connector)
- 3) LIP battery should not have liquid from electrolyte, but in case If leaked electrolyte touches bare circuit patterns, higher potential terminal material may dissolve and precipitate at the lower potential terminal, and may cause short circuit. The design of the PCM must have this covered.

7. Notice for Assembling Battery Pack:

Shocks, high temperature, or contacts of sharp edge components should not be allowed in battery pack assembling process.

- 7.1 Do not solder directly to LIP tabs. Do not bring heated tools such as soldering Iron close to LIP cells. Temperature above 80°C may cause damage to the LIP cell and degrade its performances.
- 7.2 In case that the battery pack is fixed by ultrasonic welding, it is necessary not to apply too much ultrasonic welding power to LIP cell and electronic circuits such as PCM. Otherwise it may cause serious damage to the cells and electronic circuit.

8. Other Notices:

- 8.1. Cell connection
1) Direct soldering of wire leads or devices to the cell is strictly prohibited.
2) Lead tabs with pre-soldered wiring shall be spot welded to the cells.
Direct soldering may cause damage of components, such as separator and insulator, by heat generation.
- 8.2. Prevention of short circuit within a battery pack
Enough insulation layers between wiring and the cells shall be used to maintain extra safety protection.
The battery pack shall be structured with no short circuit within the battery pack, which may cause generation of smoke or fire.
- 8.3. Prohibition of disassembly
1) Never disassemble the cells
The disassembling may generate internal short circuit in the cell, which may cause gassing, fining, explosion, or other problems.
2) Electrolyte is harmful
LIP battery should not have liquid from electrolyte flowing, but in case the electrolyte come into contact with the skin, or eyes, physicians shall flush the electrolyte immediately with fresh water and medical advice is to be sought.
- 8.4. Prohibition of dumping of cells into fire
Never incinerate nor dispose the cells in fire. These may cause explosion of the cells, which is very dangerous and is prohibited.
- 8.5. Prohibition of cells immersion into liquid such as water
The cells shall never be soaked with liquids such as water, seawater, drinks such as soft drinks, juices, coffee or others.
- 8.6. Battery cells replacement
The battery replacement shall be done only by either cells supplier or device supplier and never be done by the user.
- 8.7. Use of damaged cells Prohibited
The cells might be damaged during shipping by shock. If any abnormal features of the cells are found such as damages in a plastic envelop of the cell, deformation of the cell package, smelling of an electrolyte, an electrolyte leakage and others, the cells shall never be used any more.
Cells with any smell of the electrolyte or a leakage shall be placed away from fire to avoid explosion.

10. CAUTIONS

To ensure proper use of the battery please read the manual carefully before using it.

Handling

- Do not expose to, or dispose of the battery in fire.
- Do not put the battery in a charger or equipment with wrong terminals connected.
- Avoid shorting the battery
- Avoid excessive physical shock or vibration.
- Do not disassemble or deform the battery.
- Do not immerse in water.
- Do not use the battery mixed with other different make, type, or model batteries.
- Keep out of the reach of children.

Charge and discharge

- Battery must be charged in appropriate charger only.
- Never use a modified or damaged charger.
- Do not leave battery in charger over 24 hours.

Storage

- Store the battery in a cool, dry and well-ventilated area.
- The batteries should be stored at room temperature, charged to about 30% to 50% of capacity. We recommend that batteries be charged about once per half a year to prevent over discharge.

Disposal

- Regulations vary for different countries. Dispose of in accordance with local regulations.
- Consider the environment.

"The Chemical Reaction"

Because batteries utilize a chemical reaction, battery performance will deteriorate over time even if stored for a long period of time without being used. In addition, if the various usage conditions such as charge, discharge, ambient temperature, etc. are not maintained within the specified ranges, the life expectancy of the battery may be shortened or the device in which the battery is used may be damaged by electrolyte leakage. If the batteries cannot maintain a charge for long periods of time, even when they are charged correctly, this may indicate it is time to change the battery.

- **Users must ensure that they satisfy themselves as to the suitability for purpose of this product.**
- **SPECIFICATIONS SUBJECT TO CHANGE WITHOUT NOTICE**
- **Any other items which are not covered in this specification shall be agreed by both parties.**